REMARKS

As a preliminary matter, Applicants appreciate the courtesy extended by the Examiner during the August 24, 2004 personal interview with Applicants' representatives.

Claims 11 and 13 stand rejected under 35 U.S.C. 102(b) as being anticipated by Koji et al. (JP 6051256). Applicants traverse the rejection because Koji fails to disclose (or suggest) a piston. In addition, Applicants traverse the rejection of claim 11, as amended, because the cited reference fails to disclose (or suggest) replenishing liquid crystal into the syringe, prior to being supplied to the substrate, in a constant amount.

Koji is directed to a device for discharging liquid crystal which has liquid crystal dropped from an end of a nozzle 3, as shown in FIG. 1. A shaft 4 is rotated via a rotary mechanism to cause liquid crystal 7 present in a clearance between the shaft 4 and an inner surface of a sleeve 5 to be pushed down toward the end of the nozzle 3. Koji fails to disclose or teach a piston (i.e., a sliding piece moved by or moving against fluid pressure which consists of a short cylinder fitting within a cylinder vessel along which it moves back and forth). Koji also fails to disclose (or suggest) supplying a constant amount of liquid crystal to the syringe prior to being supplied to a substrate. Rather, the amount of liquid crystal provided between the shaft 4 and the inner surface of the sleeve 5 can vary because the predetermined amount supplied to the substrate is a result of precise rotation of shaft 4.

In contrast, the present application discloses a liquid crystal display device manufacturing system that replenishes liquid crystal into a syringe with high precision such

that the liquid crystal, prior to be supplied to the substrate, remains constant. That is, an external force insures that a substantially equal amount of liquid crystal is deposited to the substrate each time liquid crystal is dispensed from the syringe, which insures that a constant amount of liquid crystal is applied to the substrate. Since Koji fails to disclose a piston, or refilling a syringe with an equal amount of liquid crystal each time the syringe is replenished, withdrawal of the §102 rejection of claim 11 and its dependent claim 13 is respectfully requested.

Claims 1-3 and 5-6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaki et al. (U.S. Patent No. 6,322,735). In response, Applicants amended claim 1 to clarify that a portion of the liquid crystal that has adhered to a surface of the liquid crystal supply needle is caused to fall onto the first substrate by blowing a gas against the liquid crystal supply needle either during or after the dropping of the liquid crystal step, and respectfully traverse. With respect to claim 6, as amended, Applicants traverse the rejection because the cited reference fails to disclose or suggest a method of manufacturing a liquid crystal display device that includes, among other things, dropping a liquid crystal to a substrate such that a constant amount of the liquid crystal is deposited from a syringe on the substrate, and then resupplying liquid crystal into the syringe with a constant amount of liquid crystal.

Yamaki is directed to a method for molding thermoplastic resin. As illustrated in FIG. 11, for example, an injection device has a space 6 and a passage 7 that supplies gas

from a gas source to a mold positioned at the nozzle tip 3. When an injection cylinder 1 moves forward to press an outer nozzle 5 against the mold, a spring which presses the outer nozzle 5 against the mold is compressed, and a nozzle body 2 moves forward to cut off the communication between the space 6 and the mold. In this state, resin from injection cylinder 1 fills the mold (Col. 8, lns. 41-55). That is, the lowermost portion of injection cylinder 1 moves downward to contact the outer nozzle 5 and seal off the space 6. Then, resin within the injection cylinder 1 flows through the nozzle tip 3 and into the mold. While providing resin to the mold, Yamaki can not have any gas passing through the space 6 and the nozzle tip 3. Accordingly, any portion of the resin that is adhered to the surface of the nozzle tip 3 can not be blown by a gas against the nozzle tip 3 during or after the dropping of the resin, as in the present invention. For this reason, withdrawal of the rejection of claim 1 and its dependent claims 2-3 and 5 is respectfully requested.

With respect to claim 6, Yamaki discloses a molding method that incurs the same problems discussed in Applicants' Admitted Prior Art (AAPA). More specifically, as discussed in AAPA a problem of conventional injection methods is that a constant amount of liquid crystal cannot be provided to a substrate with high accuracy. This is because of the adhesion of a portion of the liquid crystal to a surface of the syringe or injection device. Yamaki can not cause a flow of gas to the nozzle tip 3 during or after the dropping of the resin, or provide a constant amount of liquid crystal to be deposited to a substrate, as in the present invention. Moreover, because different amounts of liquid crystal are provided to the

mold in Yamaki, liquid crystal resupplied into the injection cylinder is other than at a fixed, constant amount.

In contrast, as shown in FIG. 2 of the present application, air supply needles 8 and an air supply means 7 provide a pneumatic force for insuring that liquid crystal is applied to a first substrate 10 in a constant amount. Alternatively, a charger 13 shown in dashed lines can supply an electric external force to cause any adhered liquid crystal to drop from the liquid crystal supply needle 3 to the first substrate 10. In this manner, liquid crystal is supplied to the first substrate 10 with high precision such that a portion of the liquid crystal does not attach to the liquid crystal supply needle 3. For this reason, withdrawal of the §103 rejection of claim 6 is respectfully requested.

Claims 7-10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Koji in view of Yamaki. In response, Applicants traverse the rejection because the cited reference fails to disclose or suggest, among other things, a liquid crystal display device manufacturing system that includes an air supply means arranged around an external surface of the liquid crystal supply needle that is configured for blowing a gas against the external surface of the liquid crystal supply needle, as now recited in amended claim 7.

As discussed above, Koji uses a shaft 4 that is rotated by a rotary mechanism to cause liquid crystal 7 to be pushed down toward the end of the nozzle 3 and deposited on a substrate 1. Koji does not disclose using an air supply means that blows a gas against an external surface of the liquid crystal supply needle, as recited in amended claim 7.

Although Yamaki discloses the passage 7 and the space 6 for supplying the gas source to the nozzle tip 3, the space 6 is internal to the injection device. That is, gas passing through the space 6 does not contact an external surface of the outer nozzle 5, and therefore cannot achieve the advantage of the present invention. Namely, insuring that a constant amount of liquid crystal is provided to a substrate because no liquid crystal adheres to the external surface of the liquid crystal supply needle. For this reason, withdrawal of the §103 rejection of claim 7 and its depending claims 8-10 is respectfully requested.

Claims 11-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Koji in view of Shimano (U.S. Patent No. 5,277,333). Applicants traverse the rejection for the reasons recited above with respect to the rejection of claims 11 and 13 based on Koji. More specifically, the cited references fail to disclose or suggest a piston movable within the syringe, or replenishing liquid crystal into a syringe, after the liquid crystal has been supplied to the substrate such that the amount of liquid crystal in the syringe, prior to being supplied to the substrate, remains constant.

Shamano teaches in FIG. 1 filling a syringe 2 with a liquid 1. Shamano does not teach or suggest a piston positioned within the syringe 1. In addition, Shamano does not disclose or suggest replenishing liquid crystal such that the amount remains constant, by ensuring that no liquid crystal can adhere to the nozzle of the syringe 1. Rather, Shamano has the same disadvantages as discussed in AAPA. For these reasons, withdrawal of the §103 rejection of claims 11-12 is respectfully requested.

For all of the foregoing reasons, Applicants submit that this Application is in condition for allowance, which is respectfully requested. The Examiner is invited to contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

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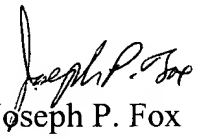
By 

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